What is claimed is:

[Claim 1] 1. A method for maintaining hydrogen purity in an electrical generator, the system comprising:

monitoring the purity of the hydrogen in the generator;

generating a signal in response to said purity falling below a predetermined threshold;

adding hydrogen gas in response to said signal;

venting hydrogen gas from said generator.

[Claim 2] 2. The method of claim 1 further comprising the step of continuing to add hydrogen gas and vent hydrogen from the generator until the purity of the hydrogen in the generator exceeds a predetermined threshold.

[Claim 3] 3. The method of claim 2 further comprising the step of opening a valve to vent gas from said generator in response to said purity signal.

[Claim 4] 4. The method of claim 3 wherein said predetermined purity threshold is greater than 90%.

[Claim 5] 5. The method of claim 4 wherein said predetermined purity threshold is greater than 95%.

[Claim 6] 6. The method of claim 5 wherein said predetermined purity threshold is 98%.

[Claim 7] 7. The method of claim 2 further comprising the step of activating a hydrogen generator in response to said purity signal.

[Claim 8] 8. The method of claim 7 further comprising the step of venting gas from said generator if the pressure exceeds a predetermined threshold.

[Claim 9] 9 The method of claim 8 further comprising the steps of providing a second purity signal in response to the purity in the generator exceeding a predetermined threshold, and stopping production of hydrogen gas in response to said second purity signal.

[Claim 10] 10. A system for maintaining hydrogen purity in an electrical generator, the system comprising:

a hydrogen generator;
an electrical generator coupled to said hydrogen generator;
a valve coupled to said electrical generator;
a purity monitor operably coupled to said generator and said valve.

[Claim 11] 11. The system of claim 10 wherein said valve operates to release hydrogen gas from said electrical generator in response to a signal from said purity monitor.

[Claim 12] 12. The system of claim 11 wherein said hydrogen generator is configured to generate hydrogen gas at a predetermined pressure, said hydrogen generator producing hydrogen gas in response to a reduction in pressure in said electrical generator.

[Claim 13] 13. The system of claim 12 wherein said hydrogen generator is an electrochemical generator having at least one polymer electrode membrane.

[Claim 14] 14. The system of claim 12 wherein said hydrogen generator produces hydrogen gas by reformation of natural gas.

[Claim 15] 15. The system of claim 13 further comprising a pressure monitor.

[Claim 16] 16. The system of claim 15 further comprising a hydrogen purifier coupled to said generator.

[Claim 17] 17. The system of claim 12 wherein said purity monitor provides a signal to said valve when the purity of hydrogen gas in said electrical generator is less than 99% pure.

[Claim 18] 18. The system of claim 12 wherein said purity monitor provides a signal to said valve when the purity of hydrogen gas in said electrical generator is less than 95% pure.

[Claim 19] 19. A system for maintaining hydrogen purity in an electrical generator, the system comprising:

an electrical generator;

a valve coupled between said electrical generator and a vent, said valve being configured to vent hydrogen gas at a predetermined vent rate; and,
a hydrogen generator coupled to said electrical generator.

[Claim 20] 20. The system of claim 19 wherein said hydrogen generator is configured to produce hydrogen at a predetermined production rate.

[Claim 21] 21. The system of claim 20 wherein said predetermined production rate substantially equals said predetermined vent rate.

[Claim 22] 22. The system of claim 20 further comprising a purity monitor coupled to said electrical generator and said valve, said valve changing said predetermined vent rate in response to a signal from said purity monitor.

[Claim 23] 23. The system of claim 22 wherein said hydrogen generator is configured to vary said predetermined production rate to substantially match said predetermined vent rate.

[Claim 24] 24. The system of claim 20 said hydrogen generator is an electrochemical generator having at least polymer electrode membrane.

[Claim 25] 25. The system of claim 20 wherein said hydrogen generator produces hydrogen gas by reformation of natural gas.

[Claim 26] 26. The system of claim 21 wherein said predetermined vent rate is set to maintain a purity of hydrogen gas in said electrical generator at greater than 98% pure.

[Claim 27] 27. The system of claim 26 wherein said predetermined vent rate is set to maintain a purity of hydrogen gas in said electrical generator at greater than 95% pure.

[Claim 28] 28. A system for maintaining hydrogen purity in an electrical generator, the system comprising:

a hydrogen generator;
an electrical generator coupled to said hydrogen generator;
a valve coupled to said electrical generator, said valve being configured to release hydrogen gas from said electrical generator at a predetermined hydrogen gas pressure level;

a purity monitor operably coupled to said electrical generator and said hydrogen generator.

[Claim 29] 29. The system of claim 28 wherein said hydrogen generator produces hydrogen gas at predetermined rate in response to a signal from said purity monitor.

[Claim 30] 30. The system of claim 28 wherein said valve releases hydrogen gas when the gas pressure in said electrical generator exceeds 100 psi.

[Claim 31] 31. The system of claim 29 wherein said hydrogen generator is an electrochemical generator having at least one polymer electrode membrane.

[Claim 32] 32. The system of claim 29 wherein said hydrogen generator produces hydrogen gas by reformation of natural gas.

[Claim 33] 33. A method for maintaining hydrogen purity in an electrical generator comprising the steps of:

monitoring the purity of hydrogen gas in an electrical generator;
releasing hydrogen gas from said electrical generator at a first rate;
generating hydrogen gas at a second rate, wherein said second rate is substantially the equal to said first rate.

[Claim 34] 34. The method of claim 33 further comprising the step of generating a signal from said purity monitor to a valve to release said hydrogen gas.

[Claim 35] 35. The method of claim 34 wherein said purity monitor generates said signal in response to the purity of hydrogen gas in said electrical generator falling below a predetermined hydrogen purity level.

[Claim 36] 36. The method of claim 35 wherein said predetermined hydrogen purity level is less than or equal to 98%.

[Claim 37] 37. The method of claim 36 wherein said predetermined hydrogen purity level is less than 95%.

[Claim 38] 38. The method of claim 33 further comprising the step of generating a signal from said purity monitor to a hydrogen generator to generate said hydrogen gas.

[Claim 39] 39. The method of claim 38 wherein said hydrogen gas is released from said electrical generator at a predetermined pressure level.

[Claim 40] 40. The method of claim 33 further comprising the step of increasing the level of said first rate in response to a reduction of in purity of said hydrogen gas in said electrical generator.

[Claim 41] 41. The method of claim 40 further comprising the step of decreasing the level of said first rate when the purity level of said hydrogen gas in said electrical generator reaches a predetermined purity level.

[Claim 42] 42. The method of claim 41 wherein said predetermined purity level is 95%.

[Claim 43] 43. The method of claim 42 wherein said predetermined level is 98%.